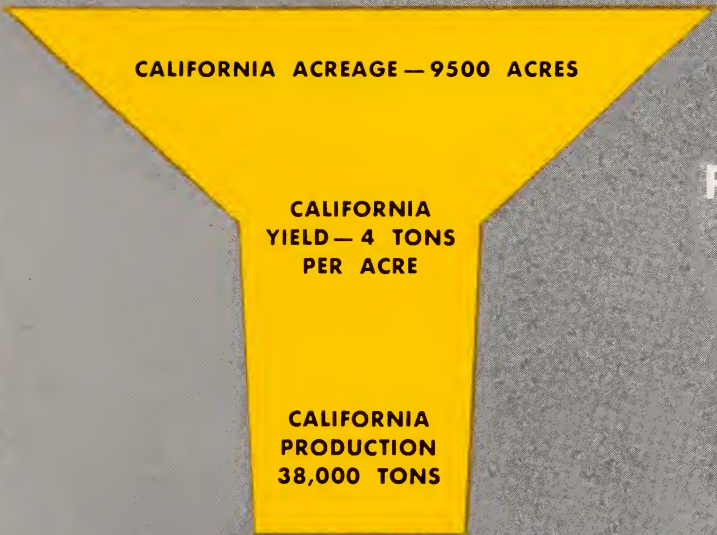
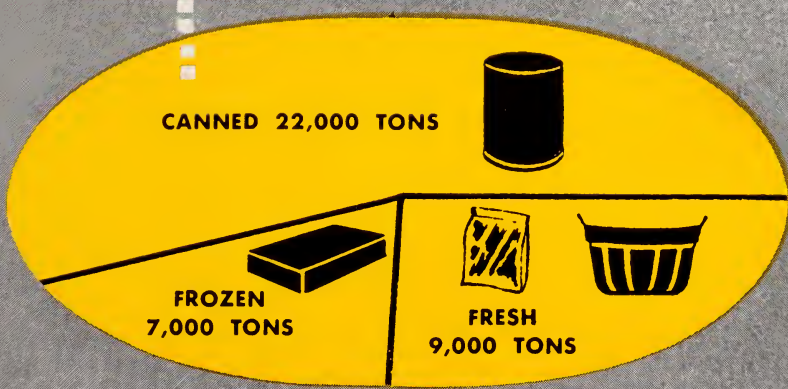


CALIFORNIA SPINACH
ECONOMIC STATUS 1948-1949



1948
PRODUCTION
AND USE

SIDNEY HOOS
P. C. HABIB



This CIRCULAR, reporting trends in the SPINACH industry during 1919-48, concerns

● **PRODUCTION**

● **ACREAGE**

● **YIELDS**

● **USE**

and

● **PRICES**

Tables and figures appearing in this circular are summaries of more detailed tables which are published in a separate Statistical Supplement. This supplement gives sources in detail and may be obtained by writing the Giannini Foundation of Agricultural Economics.

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Spinach has long been a major truck crop. Its adaptability to use in fresh, canned and now frozen form has given it a wide market. Wide distribution is possible and profitable because spinach can be handled in volume under varying conditions.

In recent years, no other food item has received more publicity on nutritional values.

Although acreage planted to spinach has greatly expanded in the last twenty-five years, the war years brought even greater expansion in both acreage and production. But since 1946, acreage and production have gone back to nearly pre-war levels.

Post-war farm prices continue at a high level owing to reduced production and increased demand.

PRODUCTION

Nation's long-time production trends influenced by 1930-32 depression and World War II

California has shown slight increasing trend and stable production level

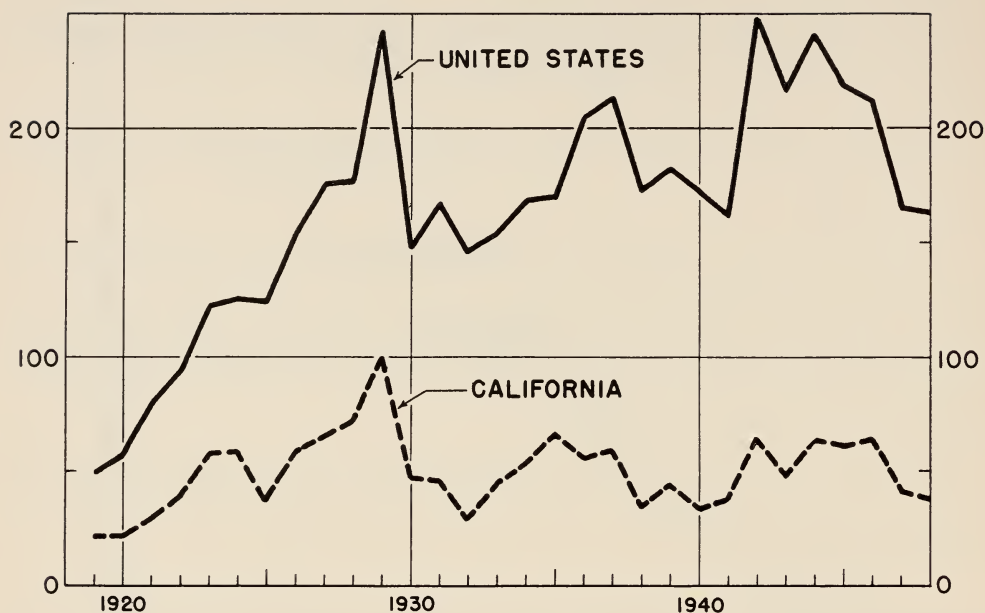
Spinach production in the U. S. increased steadily and significantly from 1918 to 1929. This trend was followed by a severe reduction in 1930. Production later rose steadily during 1932-1937, but tended downward again until the approach of the war. With the great war demand, particularly for canned spinach, production remained at a high level. The end of the war was followed by a general decrease in production. In 1948 it was below both the average of 1935-1939 and the war years.

Two Events Mark Production Trends

The depression years of the early 1930's serve as a dividing line between the rapid expansion during the 1920's and the more gradual rise in the post-depression period.

The long-time trends in production are affected by the extraordinary influences of both the great depression and World War II. This cannot be lost sight of in any consideration of production trends.

FIGURE 1
Spinach Production in the U. S., 1919–1948
 (thousands of tons)



Production increases since 1919 and during the 1920's are the result of greater demand for spinach due to increasing population, expanding income, and growing consumer acceptance of the product.

Has Demand Reached Its Peak?

Some may believe that demand has already reached its peak, and that a gradual leveling off is indicated because of a change in consumer tastes and increased availability of many other vegetables. But future prices, methods of marketing and population changes do not preclude further expansion of the industry.

California's Production Trend

Production in California has shown only a slight increasing trend since the middle 1920's. With the exception of a few years, a relatively stable production trend has been maintained. This trend

has been characterized by fairly sharp fluctuations, but in general these have balanced themselves and resulted in a stable production level.

California's Share of Nation's Crop

Spinach is grown in many states. The rapid expansion of output was a result of increased production outside California; in the East and South (fig. 1).

During 1920–1924, California produced 43 per cent of the country's total spinach production, but by 1940 its share had fallen to 19.7 per cent.

During the war years, California increased its share of national output, undoubtedly due to the increased demand for processed spinach.

In 1946, California was producing 30.4 per cent of the total spinach production, but by 1948 its share had dropped to 23.3 per cent.

California Crop Winter-produced

Commercial spinach production in California takes place only in the winter season. The crop is harvested from about December 15 to April 1.

Other areas produce spinach at different seasons, depending upon climate.

Winter-produced spinach is the most important source of fresh market spinach. In 1948, 46 per cent of U. S. fresh market production was harvested during the winter.

Spring is the next most important season, followed by summer, early fall and late fall; in that order.

ACREAGE

Nation's trend upward until 1945 with strong decline 1945-1948

California acreage fluctuated around a level trend since 1929

Other states have expanded acreage

The underlying reasons for the trends in spinach production are found in the behavior of acreage and yields.

Following World War I, the total spinach acreage in the U. S. increased rapidly (fig. 2). The upward trend continued until 1944, although there were severe acreage reductions in 1930 and during 1938-1939. During 1946-1948, there was a steady decline in total acreage.

California Acreage

During the period of rapid expansion in U. S. spinach acreage up to and including 1929, California's acreage also expanded, but not so rapidly.

Since 1929, California acreage has remained fairly constant with only periodic fluctuations. This has resulted in a steady decrease of California acreage as a per cent of the total. During 1920-1924, California had 28.1 per cent of the total acreage, but by 1948 it had only 11.6 per cent.

Acreage of Other States

Texas has a large acreage in spinach (table 1). Producing mainly for the fresh market, Texas acreage expanded rapidly until the middle 1930's. At that time 50 per cent of the total U. S. spinach acreage was in Texas.

In both California and Texas, acreage has not shown any significantly rising trend over the past ten years. The U. S. increase was a result of acreage expansion in other areas. Much of this was in states close to the main eastern markets. Acreage in all states, other than California and Texas, rose from almost 11 million acres in 1920-1924 to 56.8 million in 1943. It dropped to 35.1 million in 1948.

Where California Spinach Is Grown

In California, spinach acreage is concentrated in three main regions. These are:

FIGURE 2
Spinach Acreage in the U. S., Texas and California, 1918–1948
 (thousands of acres)

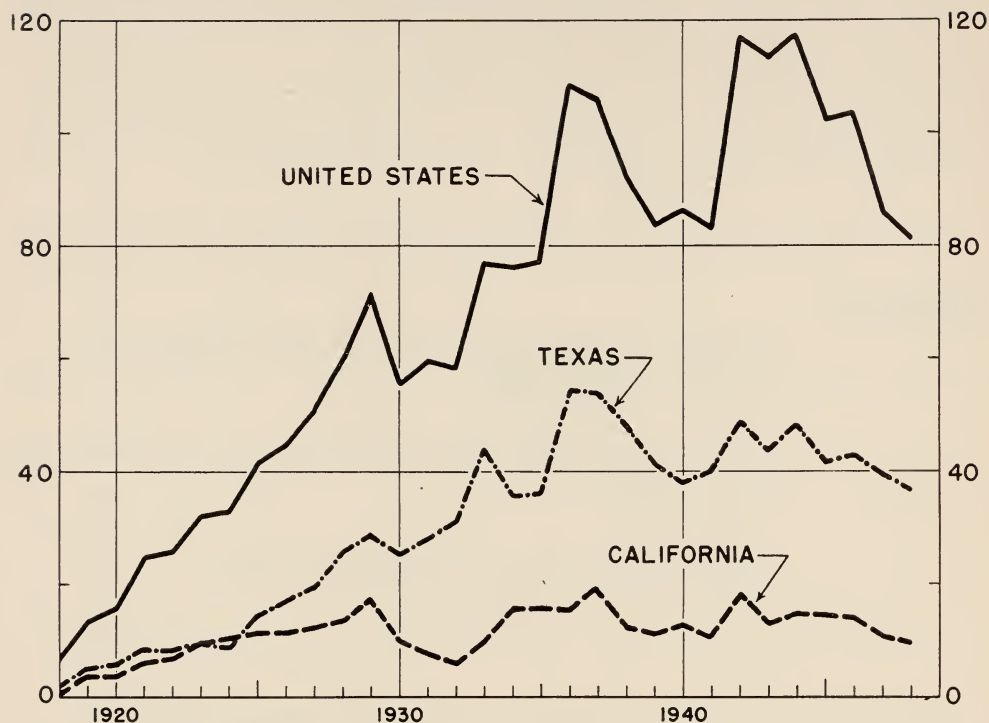


TABLE 1
Spinach Acreage
 (acres)
1920–1948

Period or year	U. S.	California	Texas	All other states
Averages				
1920–1924.....	26,198	7,346	8,058	10,794
1925–1929.....	53,698	13,114	20,992	19,592
1930–1934.....	65,318	9,774	32,642	22,902
1935–1939.....	93,454	14,620	46,760	32,074
Annual				
1940.....	86,240	12,740	37,900	35,600
1941.....	82,990	10,440	39,900	32,650
1942.....	117,020	18,090	48,800	50,130
1943.....	113,180	12,930	43,400	56,850
1944.....	117,450	14,930	48,400	54,120
1945.....	102,180	14,420	41,500	46,260
1946.....	103,470	13,990	43,000	46,480
1947.....	86,040	10,810	39,400	35,830
1948.....	81,010	9,400	36,500	35,110

1. The northern counties of the Central Valley.
2. The coast counties south of San Francisco.
3. The Los Angeles area.

The leading counties are Monterey, Los Angeles, Stanislaus, and San Joaquin. Fifteen other counties trail with small acreages.

The four leading counties have 67 per cent of the spinach acreage in the State.

During the past twenty years, there has been a shift in the California acreage. In 1928, Sacramento, Santa Clara and Alameda counties had 57 per cent of the California acreage, but by 1947 they had only 6 per cent of the California total.

Los Angeles County raises spinach almost exclusively for the fresh market. The other major producing counties concentrate on the processing markets.

YIELDS

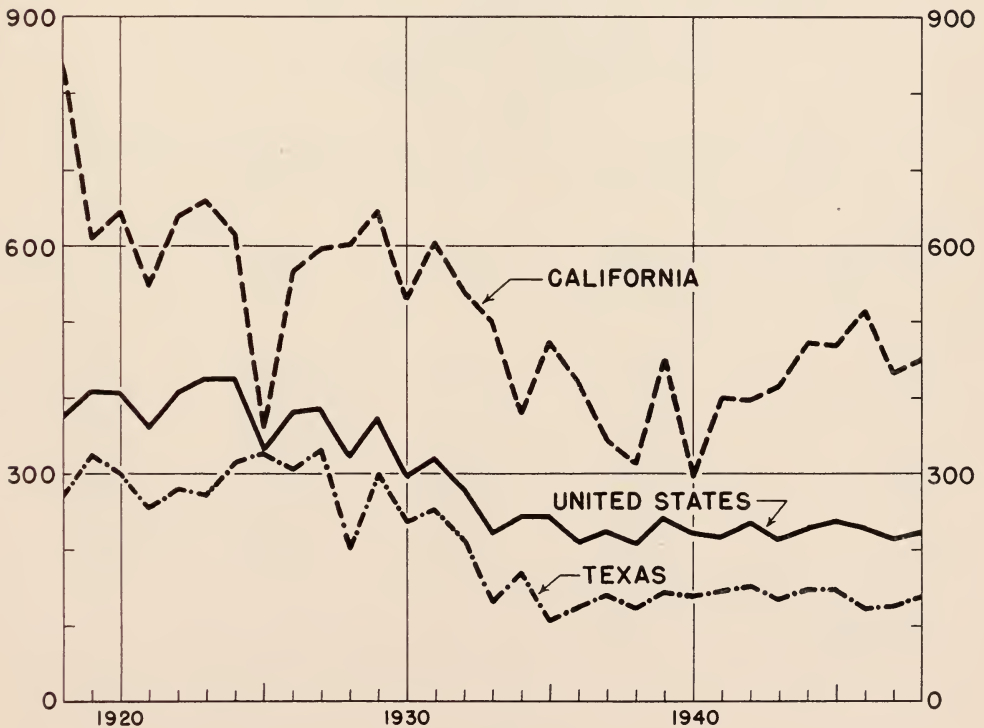
U. S. yield per acre fairly stable since 1933

California yield per acre highest in the U. S.

While there was a rapid expansion in acreage and production during 1918–1929, the yield per acre followed a slowly declining trend (fig. 3).

From 1930–1933 the U. S. yield per acre fell off rapidly. Since then the average yield has been fairly constant.

FIGURE 3
Spinach Yields in the U. S., Texas and California, 1918–1948
(bushels per acre)



In California, there has been constant fluctuation with the indication of a rising yield trend over the past ten years.

It is significant that California's yield per acre of spinach has always been much greater than in the U. S. as a whole. During 1935-1939, the average yield in California was 400 bushels per acre, whereas the U. S. yield was only 226 bushels (table 2).

Comparing California to Texas, the yield differences are large and readily apparent (table 2 and fig. 3). California's average yield has been as much as two to four times more than the Texas yield.

Spinach production and acreage have followed the same general trends since 1920. Despite exhibiting a decreasing trend, yields were high during the 1920's and production increased because of a rapidly expanding acreage. However, dur-

TABLE 2
Spinach—Yield per Acre
(bushels per acre)
1920-1948

Period or year	U. S.	California	Texas
Averages			
1920-1924 . . .	405	621	284
1925-1929 . . .	359	553	293
1930-1934 . . .	272	510	200
1935-1939 . . .	226	400	127
Annual			
1940	222	296	139
1941	217	400	145
1942	235	397	153
1943	212	416	133
1944	228	473	148
1945	238	470	148
1946	228	514	122
1947	214	431	126
1948	223	448	137

TABLE 3
Utilization of U. S. Spinach Production
(thousands of pounds)^b
1933-1948

Period or year	Total production ^a	Fresh	Canned	Frozen
Average				
1933-1936	347,029	251,764	95,265	.....^c
1937-1940	370,630	250,998	112,386	7,246
Annual				
1941	323,854	191,224	123,656	8,974
1942	495,524	226,221	239,170	30,133
1943	432,776	194,209	185,529	54,038
1944	480,708	173,408	248,924	58,376
1945	437,980	155,308	215,913	66,759
1946	424,894	144,164	211,206	69,420
1947	331,338	191,293	97,724	42,321
1948	325,386	124,547	125,262	75,577

^a Does not include production not marketed.

^b Farm weight.

^c Not available.

ing the early 1930's production did not maintain an increasing trend although acreage did. This was due to a substantial drop in yield per acre.

In the last ten years, yield per acre has been relatively stable and changes in production have followed acreage changes very closely.

UTILIZATION

U. S. crop marketed fresh, canned, and frozen California crop mostly used for processing

Spinach is marketed in three forms; fresh, canned and frozen.

Fresh Spinach. U. S. production going into fresh use declined during 1936-1941, rose slightly in 1942, and then declined steadily until 1946 (fig. 4 and table 3).

In 1947, there was a strong increase in fresh use. Whereas 34 per cent of total production in 1946 went to fresh use, it increased to 58 per cent in 1947.

Canned Spinach. In contrast, the use of spinach for canning maintained a rising trend until 1945, with canned use being greater than fresh use in four out of five years during 1942-1946. However, canned use fell significantly in 1947, when only 30 per cent of total production went to canning compared to almost 50 per cent in 1946.

FIGURE 4
Utilization of U. S. Spinach Production, 1933-1948
(millions of pounds)

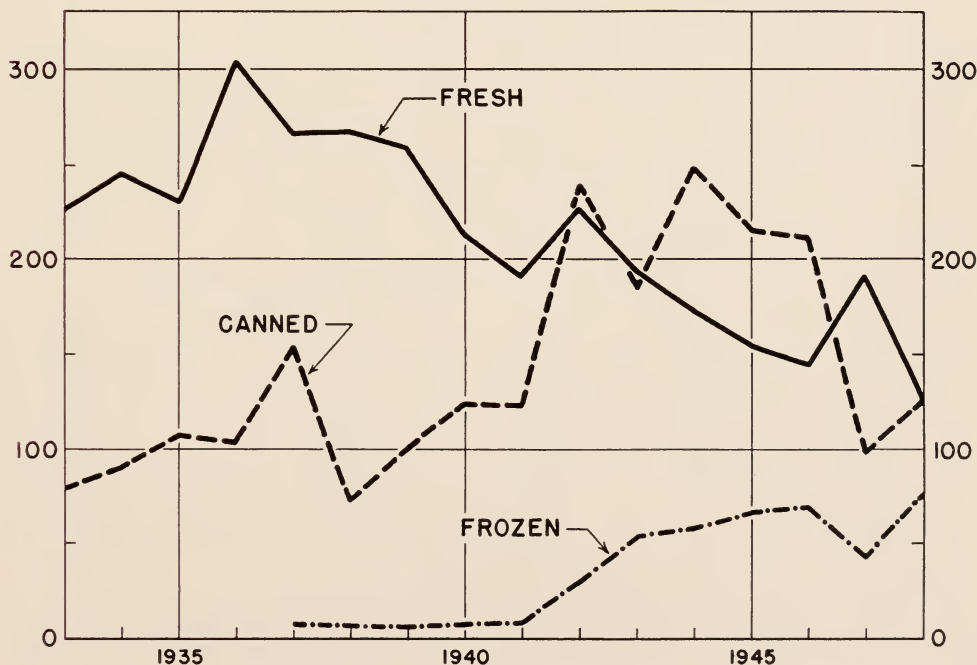
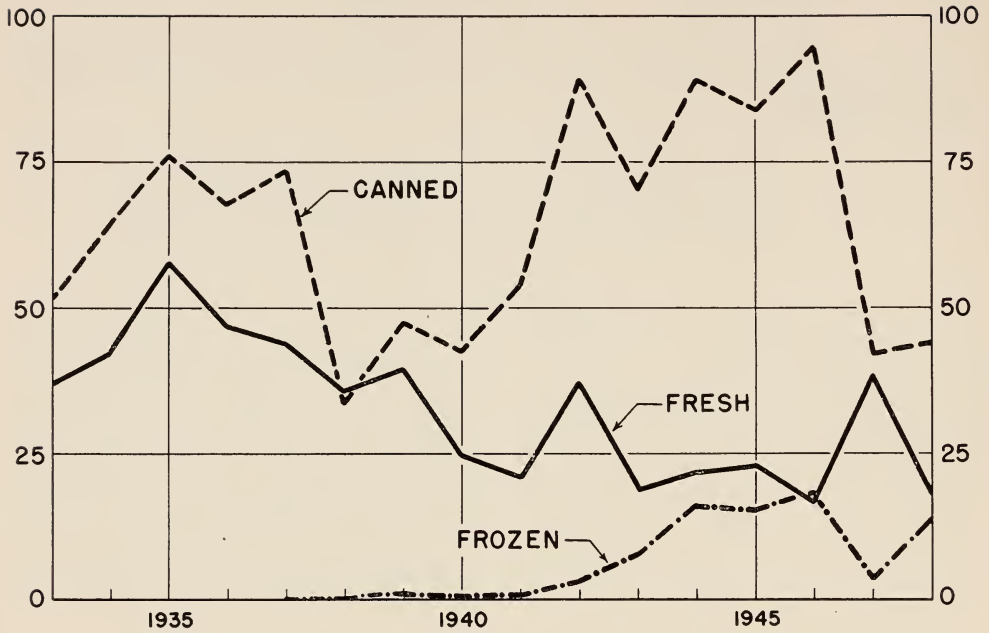


FIGURE 5

Utilization of California Spinach Production, 1933-1948
(millions of pounds)



In 1948, the distribution to canning returned to the 1946 level.

Frozen Spinach. Data on the use of spinach for freezing are available only since 1937 when 1.8 per cent of total U. S. production was frozen.

Since 1941, spinach production used for freezing has increased significantly. In 1947, 12.8 per cent of total production was frozen. It should be noted, however, that compared with a high of almost 35 thousand tons (farm weight) frozen in 1946, only 21 thousand tons (farm weight) were frozen in 1947. This reduction may well have been due to the large 1946 pack and the subsequent large carry-over, and loss of the Government as an important purchaser.

In General. Spinach production used for processing has become increasingly important. During 1937-1940, 32 per cent of total production was used proc-

essed. By 1946, 66 per cent was used processed. In 1947 it had fallen to 42 per cent.

Undoubtedly the war demand for canned vegetables for overseas shipment influenced the utilization trend. It now appears that we are returning closer to pre-war utilization, as evidenced by the situation in 1948.

Utilization in California

In California, the trend in the use of spinach production for the fresh market was steadily down until 1946 (fig. 5). But in 1947, the quantity used fresh increased considerably in spite of the sharp decrease in total production (table 4).

Canned use has been considerably greater than fresh, except for 1938 and 1947.

Frozen use increased significantly from 1942-1946. It then fell to a very low point

in 1947 but recovered again in 1948.

In 1948, both canned and frozen use rose above the previous year.

In terms of per cent of total California production, it is evident that the major use has been for processing.

The share of California production going to canning increased until 1946. Of total state production, 73 per cent went to canning in 1946 compared to an average of 59 per cent during 1933–1936. In 1947, production canned declined to half the 1946 level. Only 50 per cent of the total crop was canned.

Although California spinach used fresh declined from 41 per cent of the total state output during 1933–1936 to 13 per cent in 1946, it is significant that 46 per cent of total output in 1947 was used fresh.

The 1947 utilization pattern was not continued in 1948.

In 1948, canned use increased to 58 per cent of total production while fresh use declined to 24 per cent.

Significant changes have been evident in the use of spinach for freezing. This use became important in California in the late 1930's and increased to a great extent during the war. In 1946, as much as 14 per cent of California production was frozen.

Along with the reduction in canning in 1947, there was a sharp reduction in the quantity of spinach frozen. Only 4 per cent of California production went to freezing.

In 1948, the frozen pack increased significantly with 18 per cent of total California output being used.

Although a significant proportion of California spinach is marketed in frozen form, it is still much less than the volume of California spinach canned.

TABLE 4
Utilization of California Spinach Production
(thousands of pounds)^a
1933–1948

Period or year	Total production	Fresh	Canned	Frozen
Average				
1933–1936	110,755	45,853	64,902	.....^b
1937–1940	85,636	35,872	49,301	464
Annual				
1941	75,100	20,781	53,602	727
1942	129,356	37,159	89,088	3,109
1943	96,760	18,884	70,151	7,725
1944	127,060	21,900	89,113	16,047
1945	122,082	23,120	83,664	15,298
1946	129,316	16,547	94,462	18,307
1947	83,818	38,283	42,017	3,518
1948	75,808	18,106	43,970	13,833

^a Farm weight.
^b Not available.

CANNED SPINACH

Declined after heavy war demand and slumped badly in 1947

California losing ground to other states

Pack-year 1949-50 begins with low carry-over

Total Pack

The total U. S. canned pack has varied considerably since 1929 (fig. 6).

Following the very low pack of the early 1930's, output began to rise steadily. A cut-back occurred during the 1938 business recession, but from here on the war influence caused output to rise rapidly. It reached a high of almost 10 million cases (24 No. 2's) in 1944. Total pack fell off to slightly less than 8.5 million cases in 1946 due to war's end. It then fell off sharply to 3.9 million cases in 1947, and rose to 5 million cases in 1948.

California Pack

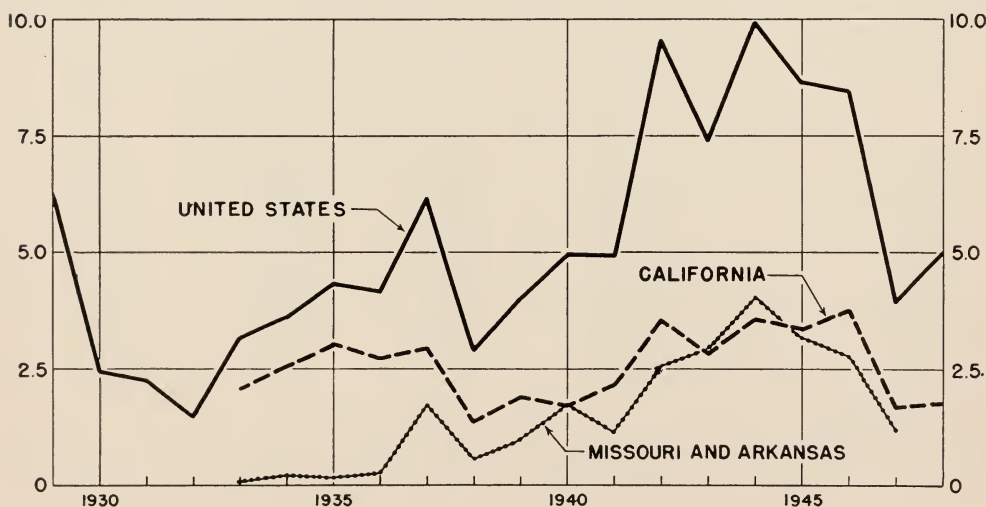
There has been a significant shift in the pack by states (fig. 7 and table 5).

In 1933, California supplied 65 per cent of the total U. S. pack, but by 1947 it supplied only 43 per cent.

The Missouri-Arkansas region has become increasingly important. Thirty-one per cent of the total 1947 pack came from these states. Thus, during the years when the total pack was increasing considerably, a greater share was coming from regions outside California in spite of the generally increasing trend of California canned pack.

FIGURE 6

Canned Spinach Pack in the U. S., California, Missouri and Arkansas, 1929-1948
(millions of cases, 24 No. 2's)



From the latest statistics available, it seems that other regions will continue to maintain their share of the total pack.

Shipments

The trend in U. S. packer shipments of canned spinach has been upward since 1934.

A sharp rise occurred after the outbreak of war (fig. 8).

Since the end of the war, a good deal of packer shipments went to replenishing inventories depleted during the war.

Shipments going to export and war services (armed forces and lend-lease) became significant in 1941. They reached a peak of 3.6 million cases in 1944-1945. This was 39 per cent of total shipments.

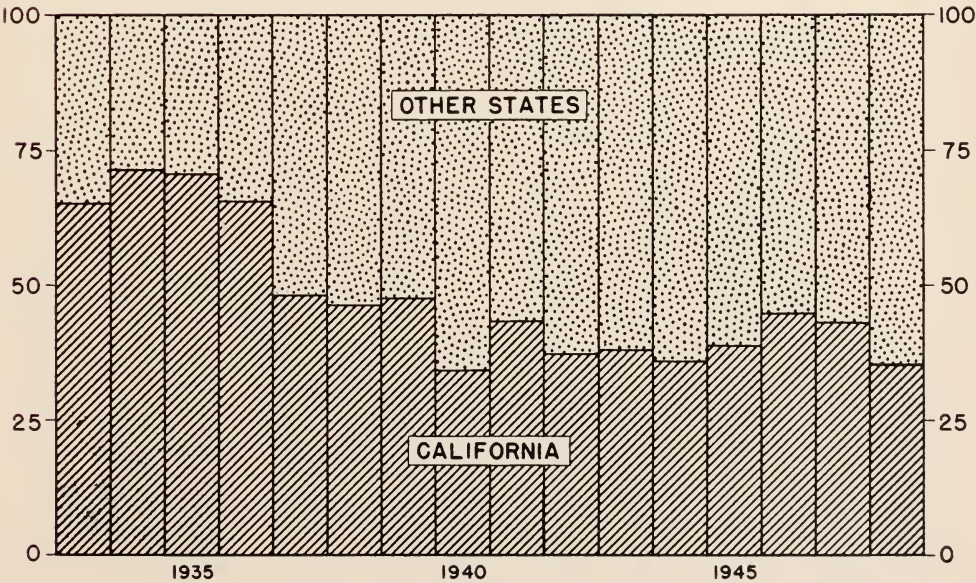
In 1946-1947, shipments to export and war services fell to one million cases, or 12 per cent of the total. Thus, while shipments to civilians increased in 1946-1947, there was a sharp reduction in exports.

TABLE 5
Canned Spinach Pack
(thousands of cases, 24 No. 2's)
1933-1948

Year	California	U. S.
1933.....	2,069	3,179
1934.....	2,564	3,602
1935.....	3,043	4,318
1936.....	2,708	4,143
1937.....	2,949	6,136
1938.....	1,335	2,883
1939.....	1,901	4,000
1940.....	1,704	4,962
1941.....	2,144	4,946
1942.....	3,564	9,567
1943.....	2,806	7,381
1944.....	3,565	9,957
1945.....	3,347	8,637
1946.....	3,778	8,448
1947.....	1,681	3,909
1948.....	1,759	5,011

FIGURE 7

Canned Spinach Pack; Percentage Distribution Between California and Other States, 1933-1948
(per cent)



In view of the small 1947 pack, it is indicated that shipments during 1947–1948 were much lower than in the previous high-pack years.

The annual movement of California canned spinach dropped from 3.3 million cases (24 No. 2's) in 1947 to slightly less than 2 million cases in 1948. This was below the 1935–1939 average, and evidently a result of the low 1947 and 1948 packs (fig. 9).

Carry-over

The carry-over may be linked to the general economic level. Normally, some stock will be held on hand by the packers. During a period of high business activity, carry-over will shrink. In depression periods, particularly following a sharp recession, the carry-over will be large (figs. 8 and 9. Table 6).

During the period of recovery after the depression, carry-over remained about the same from 1934–1937 but the business slump of 1937–1938 caught the packers with an increased pack on hand. This

resulted in a large carry-over for 1938–1939 of 1.9 million cases (24 No. 2's). Following this, there was a return to normal carry-over sufficient for working stocks.

The War Influence

At the beginning of the war, the pack took a sharp leap upward. It approached 10 million cases during 1942–1943. This was due to the heavy government demand which provided an immediate outlet for the pack.

The carry-over for 1942–1943 and 1943–1944 (fig. 9) were stocks held primarily for government use. Even these vanished in 1944–1945 as increased shipments rapidly moved the pack.

The packers' carry-over began to reappear after the war, but the pack year 1949–1950 will begin with a low carry-over compared to other peace-time years.

The California Carry-over

The carry-over in California has tended to follow the general trend except for a

FIGURE 8
U. S. Canned Spinach; Pack, Packers' Carryover, and Packers' Shipments, 1934–35 to 1948–49
 (millions of cases, 24 No. 2's)

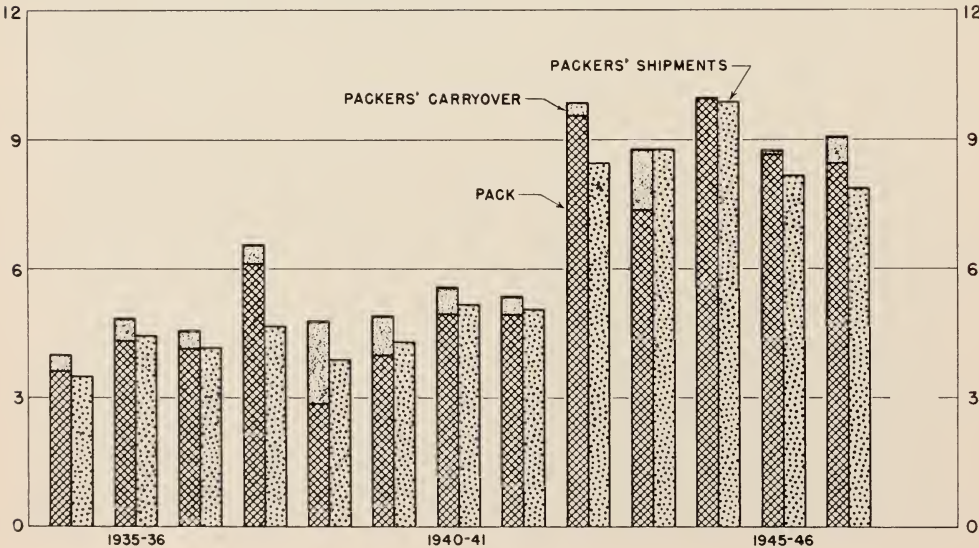
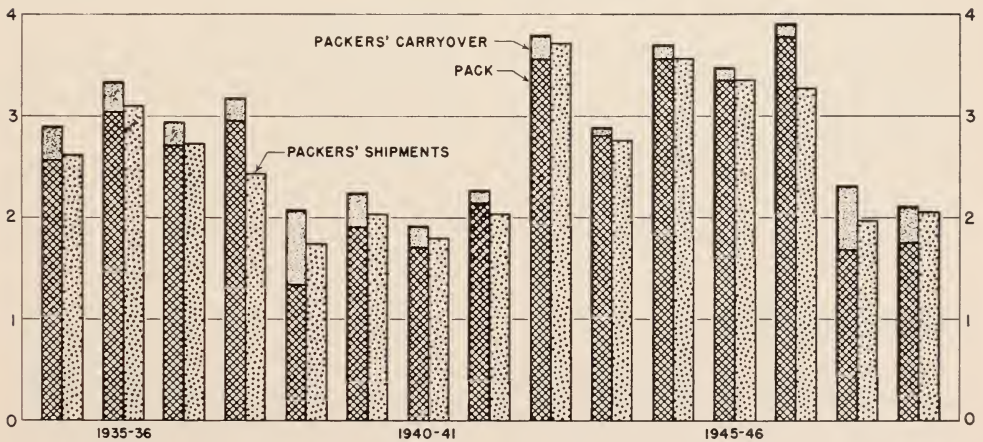


TABLE 6
U. S. and California Pack, Packers' Carry-over
and Packers' Shipments of Canned Spinach
(thousands of cases of 24 No. 2's)
1934-1950

Year (starting March 1)	U. S.			California		
	Carry-over	Pack	Shipments	Carry-over	Pack	Shipments
1934-35.....	400	3,602	3,502	325	2,564	2,604
1935-36.....	500	4,318	4,418	285	3,043	3,094
1936-37.....	400	4,143	4,143	234	2,708	2,722
1937-38.....	400	6,136	4,636	220	2,949	2,432
1938-39.....	1,900	2,883	3,883	737	1,335	1,736
1939-40.....	900	4,000	4,300	335	1,901	2,029
1940-41.....	600	4,962	5,162	207	1,704	1,794
1941-42.....	400	4,946	5,046	116	2,144	2,032
1942-43.....	300	9,567	8,467	227	3,564	3,717
1943-44.....	1,400	7,381	8,781	74	2,806	2,758
1944-45.....	0	9,957	9,857	121	3,565	3,562
1945-46.....	100	8,637	8,137	124	3,347	3,348
1946-47.....	600	8,448	7,848	122	3,778	3,271
1947-48.....	1,200	3,909	.....	630	1,681	1,967
1948-49.....	.....	4,989	.....	343	1,759	2,048
1949-50.....	.....	.....	.....	54	.....	.....

FIGURE 9

California Canned Spinach; Pack, Packers' Carryover and
Packers' Shipments, 1934-35 to 1948-49
(millions of cases, 24 No. 2's)



small carry-over maintained during the war.

After the war, the carry-over increased rapidly. This did not continue. The low pack of 1947, and the small pack of 1948 have been followed by low carry-overs.

The peculiarities of the 1948 pack are reflected in the nearly current carry-over figures. The Cannery League of California

reported that as of January 1, 1949, the pack unsold and on hand was 29,610 actual cases compared to 282,972 cases on the same date in 1948.

By March 1, 1949, when some 1948 packing had occurred, canners' stocks were some 40,172 cases compared with 266,284 cases a year before.

MARKETING FRESH SPINACH

California fresh spinach mostly marketed within State

Cellophane packaging opens way to better consumer demand and merchandising

Fresh spinach may be shipped either to distant or local markets.

In the past, spinach was packed in crates or baskets. It was packed bunched or loose.

For distant markets, fresh spinach is shipped in paper-lined lettuce crates. It is usually loose and unwashed. Crushed ice is added, and it is shipped under refrigeration in carload lots.

In California, most fresh spinach reaches local markets by truck.

Fresh spinach for the local market is harvested and delivered the next day. The yellow, dead or diseased leaves are removed and the spinach is watered to keep it fresh and turgid. It reaches the retailer as soon as possible.

Cellophane Bags

Pre-packaging of fresh spinach has increased in the last few years. The spinach is thoroughly cleaned, sorted and packaged in cellophane consumer-size bags.

The consumer gets a clean product which needs a minimum of preparation before cooking.

Spinach is particularly suited to pre-packaging. It is the most important packaged vegetable crop.

In California, about half of the fresh spinach sales in the Los Angeles and San Francisco areas are made in branded consumer-size packages.

Packaging has been confined to the local market, but it is probable that it will be used for distant markets.

Pre-packaging makes branding and advertising possible. This has an important influence on marketing methods. Packaging makes the product more attractive and in better demand.

It should be noted that if the consumer-package develops on a large scale, the purchases and sales of packers may be large enough to affect selling prices in the field.

CONSUMPTION

**Actual data unavailable but other trends show
U. S. fresh consumption decreasing**

Canned and frozen increasing

Actual consumption data are not available, but certain trends are evident from utilization and shipment data.

Before the war, both canned and frozen spinach were increasing in importance. It seemed that processed spinach was replacing consumer demand for fresh spinach.

The situation during and since the end of the war is confused because much of the canned shipments did not go directly

to the consumer. They were used to rebuild war-depleted stocks of distributor and retail outlets. However, in spite of the low canned and frozen packs of 1947 and 1948, the indicated consumption of processed spinach is still high compared to pre-war years.

In contrast, indicated fresh spinach consumption is below the average for 1935–1939.

CALIFORNIA FARM PRICES

Rose rapidly during war, reaching peak in 1944

Post-war prices continue on high level

**Less production and greater demand keeps
prices up**

California farm spinach prices from 1919 through 1948 may be divided into several periods.

Prices followed a downward trend until 1926 when they flattened out for several years. They rose during 1930–1932. From 1933 through 1942, prices generally followed a gradual upward trend. A marked rise occurred in 1943. Since 1943, annual prices have fluctuated around a record level (fig. 10).

When the downward price trend up to 1926 developed, there also developed an upward production trend over the same

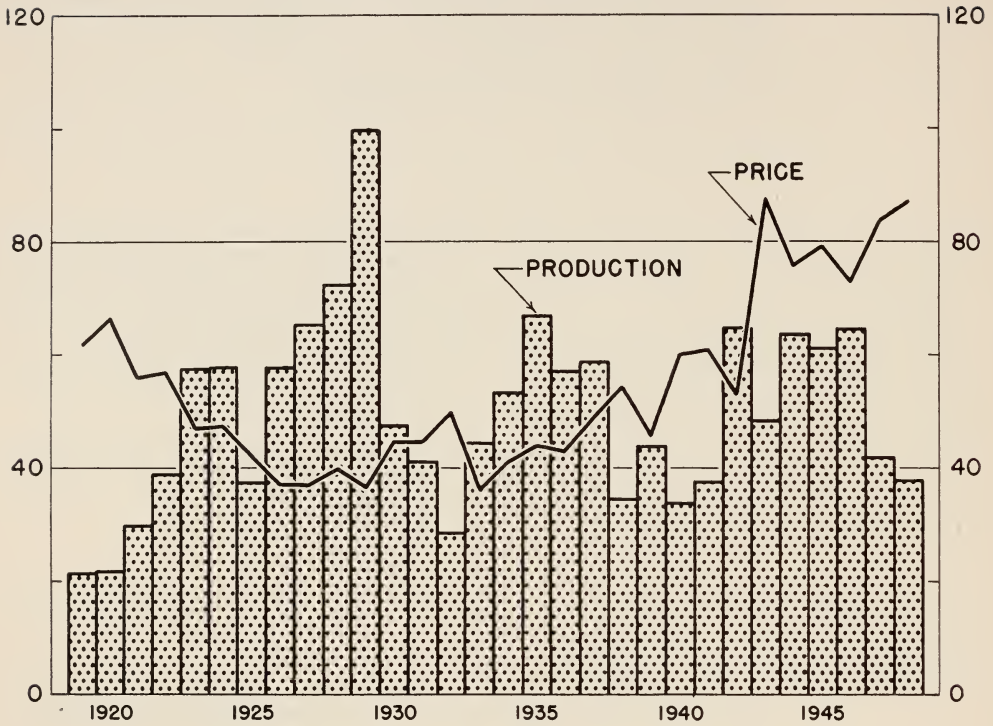
period. Prices remained stable during the latter half of the 1920's despite the marked increase in production. The price behavior reflects the strong increase in demand during those years.

In the depression years of the early 1930's, prices held up chiefly due to markedly reduced production.

As the U. S. recovered from the depression, California farm prices advanced. This was due to economic recovery throughout the U. S. and production declining again rather than returning to previous high levels.

FIGURE 10

California Spinach Production and Average Farm Price, 1919-1948
(thousands of tons, and dollars per ton)



During the national defense and war years, spinach farm prices rose along with other prices. Increased demand, especially for processed spinach, played a strong part in the price picture.

Although processed output increased during the war, total production (processed and fresh combined) was stable and remained below previous record levels.

High farm prices during 1947 and 1948

reflected low production compared to other years. California spinach farm prices in recent years have not only been higher than before the war, but they also have not suffered post-war declines as in some other farm prices.

Reduced production coupled with expanded demand accounts for high post-war prices.

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